



THE DEPARTMENT OF THE NAVY'S INFORMATION TECHNOLOGY MAGAZINE

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## A World Without Spectrum

By Thomas Kidd - July-September 2010

Imagine a world without wireless devices: no radios, no televisions, no radar or satellite systems, no keyless car locks, and no cell phones. Except as the plot of a low budget "B" science fiction movie, this isn't something most of us could imagine. But what would the world be like without radio frequencies?

The RF spectrum is where nearly all commercial and military electromagnetic spectrum dependent systems operate. RF is the workhorse of the electromagnetic spectrum. Generally, RF is categorized as those frequencies between 3,000 and 3,000,000,000,000 hertz. It is unimaginable how modern civilization could survive without RF. Could the Navy and Marine Corps successfully conduct 21st century operations without RF?

To fully appreciate how RF is integrated into our lives, businesses, and our national security, we must imagine a day without RF. Forget about waking to a clock-radio playing music or the local news; the radio would be nonexistent without RF. Traditional over-the-air television, as well as cable TV, would also be out of service since both rely in part, or in whole, on RF frequencies.

The morning weather forecast is important to many people, and while we might think that we could simply use other media, such as newspapers, to provide daily weather forecasts, meteorologists heavily use RF for critical weather forecasting tools such as Doppler radar, weather satellites and remote wireless weather sensors. Without RF, the weather forecast would be much different. For example, on Sept. 8, 1900, more than 6,000 men, women and children lost their lives when a hurricane tore across Galveston, Texas. Advanced satellite capabilities were not available yet, and the storm came with little warning. Accurate predictions of when and where rain or snow will fall would be nearly impossible because satellite weather images would not be attainable.

As we go through our day without RF we would not have: automobile or satellite radios; the Global Positioning System (GPS); cell phones; traffic cameras (they are wireless); radar speed guns; or police radios. And while the absence of radar speed guns may be appealing to some people, imagine no radios enabling emergency services. Modern emergency response systems would be crippled without RF. In the first decades of the 20th century, police, fire and ambulance personnel could take hours to respond to an emergency. Without radio, public safety officers relied on primitive telephone call boxes to communicate. It wasn't until the 1930s that cities began to install two-way radios in police cars.

RF was a new technology when the Navy began broadcasting to ships in 1904, and this use of RF dramatically enhanced afloat safety. Today, the Navy and Marine Corps rely heavily on RF-dependent and RF-enabled capabilities. Thankfully, a sudden and total loss of RF is not likely. But, a new and increased use of spectrum worldwide is challenging the Department of the Navy's (DON) ability to ensure worldwide spectrum access and use for the Navy and Marine Corps. As a result, vital naval capabilities can be impacted due to increasing spectrum use by host nations.

Spectrum congestion in many areas of the world has reached a point where host nations are reallocating spectrum that once supported U.S. naval forces, to now support their own commercial and public use. The issue is serious, and the DON has implemented a number of requirements for the acquisition of spectrum-dependent equipment to attain the highest possible assurance that naval RF requirements are retained. These requirements address "spectrum supportability" and are mandated in DON as well as Department of Defense acquisition and spectrum management instructions.

Like a sci-fi movie where mankind is often complacent of the impending crisis, so too have we become complacent of our dependence on RF spectrum. The future of naval operations will include systems that are reliant on RF. And while we will never experience a day when RF stops working, we see too many days where critical RF systems are unusable because the DON does not have access to this vital resource. The DON CIO is engaged in strategic spectrum management to continually examine its dependency on RF investments in spectrum supportable systems and technology.

*Thomas Kidd is the director of strategic spectrum policy for the Department of the Navy. For more information, contact Mr. Kidd at [DONSpectrumTeam@navy.mil](mailto:DONSpectrumTeam@navy.mil).*

TAGS: Spectrum, Telecommunications, Wireless

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